

75% Evaporated	263	280	259	258	254	259	256	257	258	254	255	254	254	253	251
80% Evaporated	278	278	275	274	271	269	269	267	267	265	265	263	263	262	283
85% Evaporated	295	294	292	291	290	281	281	279	279	278	277	276	275	274	272
90% Evaporated	317	316	312	312	310	296	297	293	294	293	292	291	290	289	291
95% Evaporated					343	316	319			317	312			310	308
End Point	346	346	345	342	347	323	322	314	317	320	315	309	309	312	310
% Recovered	95.2	94.7	94.7	95	94.9	95.3	95.3	95.4	95.4	95.4	95	95	95	95	95.3
Temperature for a Vapor-Liquid Ratio of 20, ° F.	151	140	136	135	135	160	148	143	141	140	165	152	146	144	142
Ethanol, vol %	0	1.47	3.44	5.61	9.77	0	1.25	3.21	5.39	9.67	0	1.39	3.28	5.48	9.77
Hydrocarbon Type, vol %															
Aromatics	32.78	32.35	31.71	30.66	32.36	34.45	34.68	34.4	33.35	31.29	36.28	35.55	35.5	34.01	32.36
Olefins	0.43	0.42	0.4	0.41	0.17	1.41	1.47	1.42	1.37	1.3	0.23	0.23	0.24	0.16	0.17
n-Paraffins	11.52	11.27	11.08	10.88	5.63	11.31	11.01	10.77	10.59	10.21	6.43	6.33	6.14	6.1	5.83
i-Paraffins	41.03	40.25	39.39	38.79	47.23	37.1	36.08	34.92	34.42	33.16	52.04	51.52	50.05	49.38	47.23
Naphthenes	12.57	12.51	12.3	12.02	4.05	14.61	14.33	14.08	13.81	13.2	4.41	4.43	4.23	4.23	4.05

[0094] While the invention has been described with preferred embodiments, it is to be understood that variations and modifications may be resorted to as will be apparent to those skilled in the art. Such variations and modifications are to be considered within the purview and the scope of the claims appended hereto.

What is claimed is:

1. A method for blending unleaded gasoline having an RVP of 8.0 or less, which comprises

providing a substantially oxygenate free unblended gasoline blend stock which has an RVP of no greater than 7.0; and

adding ethanol to the gasoline blend stock in an amount such that the final gasoline meets the California Code of Regulations, with the unleaded gas to which the ethanol is added having a T50 sufficiently high such that the ethanol addition does not cause T50 value to drop below the ASTM D 4814 minimum requirement of 170° F.

2. The method of claim 1, wherein the RVP of the substantially oxygenate free blend stock is no greater than 6.5.

6. The method of claim 1, wherein the RVP of the substantially oxygenate free gasoline blend stock is in the range from about 5.5-6.0 psi.

7. The method of claim 1, wherein the final unleaded gasoline has an RVP of 7.5 psi or less.

8. The method of claim 1, wherein the RVP of the final gasoline is 7.0 psi or less.

9. The method of claim 1, wherein the amount of ethanol added to the gasoline blend stock is at least 2.0 vol % based on the final gasoline.

10. The method of claim 1, wherein the amount of ethanol added to the gasoline blend stock is in an amount of at least 4.0 vol %.

11. The method of claim 1, wherein the amount of ethanol added to the gasoline blend stock is in an amount of at least 6.0 vol % based upon the final gasoline.

12. The method of claim 1, wherein the ethanol is added to the gasoline blend stock at a location different from the location at which the blend stock was blended.

13. A gasoline blend stock composition which contains

US 2002/0035802 A1

Mar. 28, 2002

5

an amount between about 15 and about 55 percent by volume, and the n-butane may be present in a level between zero and about 15 percent by volume. More preferred motor fuel compositions contain from about 25 to about 40 percent by volume of pentanes plus, from about 25 to about 40 percent by volume of ethanol, from about 20 to about 30 percent by volume of MTHF and from zero to about ten percent by volume of n-butane.

[0046] The compositions of the present invention may be formulated as summer and winter fuel blends having T10 and T90 values as measured by ASTM-D86 within ASTM

be a primary source of unburned hydrocarbons during the cold start phase of engine operation. The lower values of "heavy-end" components in the compositions of the present invention also indicates superior emissions performance. The amount of solid residue after combustion is only one-fifth that typically found in conventional gasoline.

[0047] A particularly preferred summer fuel blend contains about 32.5 percent by volume of pentanes plus, about 35 percent by volume of ethanol, and about 32.5 percent by volume of MTHF. This blend is characterized as follows:

Test	Method	Result	Conditions
API Gravity	ASTM D4052	52.1	60° F. (15.6° C.)
Distillation	ASTM D86		
Initial Boiling Point		107.0° F. (41.7° C.)	
T10		133.2° F. (56.2° C.)	
T50		161.8° F. (72.1° C.)	
T90		166.9° F. (74.9° C.)	
Final Boiling Point		195.5° F. (90.8° C.)	
Recovered		99.5 wt. %	
Residue		0.3 wt. %	
Loss		0.2 wt. %	
DVPE	ASTM D5191	8.10 psi (0.5 atm.)	
Lead	ASTM D3237	<0.01 g/gal ($<2.64 \times 10^{-3}$ g/l)	
Research Octane No.	ASTM D2699	96.8	
Motor Octane No.	ASTM D2700	82.6	